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EXAMINER

WILSON, MICHAEL H

ART UNIT

PAPER NUMBER

1786

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                       |  |
|------------------------------|--------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/562,124 | <b>Applicant(s)</b><br>FUKUOKA ET AL. |  |
|                              | <b>Examiner</b><br>MICHAEL WILSON    | <b>Art Unit</b><br>1786               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,28,33,34,38 and 39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,28,33,34,38 and 39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action is in response to Applicant's amendment filed 18 June 2010, which cancels claims 22, 23, 27, 30, 32, and 35-37, amends claims 1, and 34, and adds new claims 38 and 39.

Claims 1, 28, 33, 34, 38, and 39 are pending.

2. The rejection of claims 22, 23, 30, and 35-37 under 35 U.S.C. 102(b) as being anticipated by Keisuke et al. (JP 2002/367784 A) is moot because of Applicants cancelling of the claims.

3. The rejection of claim 27 under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734) in view of Mori (US 6,215,245 B1) Tsutsui et al. (US 2003/0127967 A1), and Forrest et al. (US 5,703,436) is moot because of Applicants cancelling of the claim.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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5. Claims 1, 28, and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Kido et al. (US 2003/0189401 A1).

Regarding claims 1 and 28, Kido et al. disclose an organic electroluminescent device comprising two or more light-emitting layers between a cathode and an anode [0025]. Between the light-emitting layers the reference discloses a charge generation layer [0025] comprising a metal oxide including  $\text{Re}_2\text{O}_7$  meeting the limitation  $\text{ReO}_{3.5}$  [0035]. The reference also discloses the device as part of the light source (i.e. screen) of a display device ([0010] and [0319]).

Regarding claim 39, Kido et al. disclose all the claim limitations as set forth above. Additionally the reference discloses an electron injection layer on the anode side of the charge generation layer comprising a reducing dopant ([0041] and [0181]).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1, 28, 33, 34, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734) in view of Mori (US 6,215,245 B1) and Tsutsui et al. (US 2003/0127967 A1).

Regarding claims 1, 33, 34, and 38, Tanaka et al. disclose an organic electroluminescent device comprising at least two light-emitting layers between an anode and a cathode (column 2, lines 53-54) and an intermediate electrode layer being interposed between emitting layers (column 2, lines 56-60). The intermediate electrode is disclosed to comprise a single layer or a multilayer structure of a plurality of layers (column 7, lines 42-67). The reference discloses that the semiconducting material may be an acceptor that is a conductive oxide containing a transition metal, CuO, (column 8, lines 12 and 29), and a donor that is an alkali metal and/or an alkaline earth metal (column 8, lines 6-8 and 19-20). The reference also discloses that electrode material and compounds with electron injection ability may be used in the intermediate layer (column 7, lines 48, 49-50; column 8, lines 7-8). However the reference does not explicitly disclose IrO<sub>2</sub>, MoO<sub>2</sub>, NbO, OsO<sub>2</sub>, ReO<sub>2</sub>, or ReO<sub>3</sub> as suitable material. The reference also does not explicitly disclose using an alkali metal and metal oxide in a single layer.

Mori teaches a similar electroluminescent device with a cathode that has improved interfacial cohesion and electron injection efficiency (column 1, line 67 to

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column 2, line 2). The reference teaches  $\text{IrO}_2$ ,  $\text{MoO}_2$ ,  $\text{NbO}$ ,  $\text{OsO}_2$ ,  $\text{ReO}_2$ , or  $\text{ReO}_3$  are suitable compounds for use in the cathode (column 3, lines 50-52).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the transition metal oxides of Mori with the device of Tanaka et al. One of ordinary skill would reasonably expect success because Mori teaches the compounds as suitable for cathodes and teaches the compounds to stabilize alkali metals in a cathode (column 3, lines 29-32). One of ordinary skill in the art would be motivated by a desire to improve interfacial cohesion and electron injection efficiency (column 1, line 67 to column 2, line 2).

Tsutsui et al. teach a similar organic electroluminescent device [0001] with an intermediate electrode (figures 2B and 7). The reference teaches n-type and p-type materials mixed into the same layer ([0110] and [0117]) making a single donor-acceptor layer as an intermediate layer (electrode). The reference also teaches using alkali metals in the same layer [0117].

It would be obvious to one of ordinary skill in the art at the time of the invention to add the teaching of Tsutsui et al. to the device of modified Tanaka et al. making the layer containing the n-type and p-type semiconductors and the electron injection ability compound in to a single layer. One of ordinary skill would reasonably expect such a combination would be suitable given that Tsutsui et al. teach the materials may be used in the same layer. One of ordinary skill would be motivated by a desire to simplify the layer design of the device.

Regarding claim 28, modified Tanaka et al. discloses all the claim limitations as set forth above. Additionally the reference discloses wherein the device is comprised in a display device, such as an SVGA screen of over 12 inches (column 3, lines 42-48).

9. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734) in view of Mori (US 6,215,245 B1) and Tsutsui et al. (US 2003/0127967 A1) as applied to claim 1 above, and further in view of Liao et al. (US 2004/0227460 A1).

Regarding claim 29, modified Tanaka et al. disclose all the claim limitations as set forth above. However the reference does not explicitly disclose using an extra electron injection layer on the anode side of the intermediate connective layer.

Liao et al. teach a similar tandem organic electroluminescent device (abstract). The reference teaches a separate electron injection layer can be used to facilitate injection of electrons into the electron transport layer (which is on the anode side of the intermediate connective layer) resulting in a low driving voltage [0143]. The reference teaches the electron injection layer comprises reducing agents [0143].

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the electron injection layer of Liao et al. with the device of modified Tanaka et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that both references teach similar electroluminescent devices with intermediate connective layers and multiple light emitting layers. One of ordinary skill in the art would be motivated by a desire to lower drive voltage.

### ***Response to Arguments***

10. Applicant's arguments filed 18 June 2010 have been fully considered but they are not persuasive.

Applicants argue that a person of ordinary skill in this art would not be motivated to combine Mori (US 6,215,245 B1) and Tanaka et al. (US 6,107,734). Applicants assert that Mori does not say that conductive oxides enhance the injection efficiency of a cathode, but fail to support this assertion in any way. In addition Applicants assert, Mori states that such compounds may be used "if their conductivity is equivalent to those of pure metals." (column 3, lines 49-50), thus discloses conductive materials, not semiconductive materials. Therefore Applicants assert that, if a person of ordinary skill in the art were to replace P-type CuO with the conductive material of Mori, the hole injection property of the intermediate conductive layer would be significantly affected. However the rejection of record does not "replace P-type CuO" but adds the materials taught by Mori with motivation given by Mori. Applicants also appear to be arguing that the compounds taught by Mori could not meet the claim limitations arguing they are "conductive materials" and not "semiconductive materials" stating that Mori discloses conductive materials not semiconductive materials. However Mori is not used to teach a "semiconductive material" but a conductive oxide comprising a transition metal. Tanaka et al. in view of Mori teach a semiconductive material comprising at least one conductive oxide comprising a transition metal. Finally Applicants conclude that a person of ordinary skill in this art would not be motivated to use a conductive material



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for use in a cathode, in a semiconductive layer which has a dual function of supplying electrons and holes, however fail to support this assertion with evidence or a persuasive argument.

Regarding Applicants assertion of unexpected results, while a showing of unexpected results can overcome a rejection under 103, it is well settled that evidence presented to rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains and that such evidence which is considerably narrower in scope than claimed subject matter is not sufficient to rebut a prima facie case of obviousness. *In re Dill*, 604 F.2d 1356, 1361, 202 USPQ805, 808 (CCPA 1979). The evidence is not commensurate with the scope of the present claims as noted in the previous Office Action mailed 21 December 2009.

### ***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1786

MHW